Tuesday, January 18. 2011

Crowne Plaza Hotel - Greenspoint (former Sofitel)
425 North Sam Houston Pkwy E

Social 11:15 AM, Luncheon 11:30 AM

Cost: $31 pre-registered members; $35 for non-members & walk-ups.

To guarantee a seat, you must pre-register on the HGS website and pre-pay with a credit card.
Pre-registration without payment will not be accepted.
You may still walk up and pay at the door, if extra seats are available.

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Best Practices for the Collection, Analysis, and Interpretation of Seabed Geochemical Samples to Evaluate Subsurface Hydrocarbon Generation and Entrapment

The detection and measurement of migrated hydrocarbons in near-surface marine sediments has become a relatively routine exploration method in the petroleum industry to better understand hydrocarbon charge. The presence of near-surface migrated thermogenic hydrocarbons provides strong evidence an active petroleum system is present as well as critical information on source, maturity and migration pathways. There are multiple methods currently applied by industry contractors to collect, prepare, extract, and analyze near-surface migrated hydrocarbons contained within marine sediments.

To improve the detection of seabed migrated thermogenic hydrocarbon seepage, core samples should be collected along major migration pathways (cross stratal leakage features) identified by conventional deep seismic and high-resolution seafloor imaging technology. Not all targeted cores will hit the designated feature and thus collecting replicates along key migration features is critical. Collecting sediment samples below the Zone of Maximum Disturbance to avoid possible transition zone alteration effects and ROM (recent organic matter) masking problems is critical. Choosing the coring device best suited for local seabed conditions will maximize both penetration and sample recovery. Real time imaging provides greater detail to confirm feature and provides a specific feature to target.

Multiple sections per core should be collected at variable depths providing a depth profile. Geochemical analysis should include a full range of hydrocarbon types; light hydrocarbon gases (C_1 to C_5), middle boiling point gasoline plus range (C_5 to C_{10}), and high molecular weight hydrocarbons (C_{15+}). Two types of geochemistry samples should be collected; one to capture the volatile light hydrocarbons (C_1 to C_{10+}) and non-hydrocarbon gases; and a second for the higher molecular weight hydrocarbons (C_{12+}). The light hydrocarbons require special handling and containers to limit volatile loss and prevent post sampling microbial alteration. Bulk sediment measurements such as quantity of organic matter and sand percent can be very helpful.

The identification of the *background* versus *anomalous* populations is critical when evaluating anomalous seabed hydrocarbons. Note that the sediment hydrocarbons are normally highly altered and may not resemble conventional reservoir gas or oil. Mapping thermogenic hydrocarbon seeps (oil and gas) relative to key cross-stratal migration pathways via fluid flow modeling and seismic attribute analysis provides an effective petroleum systems evaluation tool to better understand the seepage relative to subsurface hydrocarbon generation and entrapment. ■

Biographical Sketch

Michael A. Abrams is currently Manager Geochemistry with Apache Corporation. Prior to working with Apache, Michael was Manager Petroleum Geochemistry and Senior Research Scientist for the University of Utah's Energy & Geoscience Institute (EGI) and Senior Research Geochemist with Exxon Production Research Company. Michael has 30 years experience in petroleum exploration, production, and research providing integrated geochemical services. His research interests include surface geochemistry, petroleum systems evaluation, reservoir geochemistry, shale gas, and migration pathway analysis. Michael chaired two AAPG Hedberg Conferences related to near-surface seepage, was AAPG Memoir 66 co-editor for *Hydrocarbon Migration and Its Near Surface Expression,* and is co-editor of the forthcoming AAPG-SEG joint publication *Hydrocarbon Seepage: From Source to Surface.* Michael has a B.S. in geology from George Washington University, M.S. in geology from the University of Southern California, and Ph.D. in geochemistry from Imperial College London.